Talking about AI

An oracy-rich approach to navigating a digital world

Booklet 3



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STEM LEARNING

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About this booklet

This booklet focuses on one essential question in AI literacy: What is the impact of AI on the planet? This is a contentious topic, and one surrounded by misinformation. The 2025 Curriculum and Assessment Review (CAR) emphasises the importance of climate education and sustainability across multiple subjects, recommending explicit integration into the geography purpose of study, updated climate science content in science, sustainability principles in design & technology, and age-appropriate climate justice in citizenship, recognising it as both a civic imperative and an economic necessity for the emerging green economy.

What is the impact of AI on the planet?

AI is often talked about as if it exists only in the digital world. However, the infrastructure that powers AI is physical, requiring minerals, water and electricity, and producing emissions. Framing the 'impacts' around four themes – land, water, energy and electricity helps students visualise the problems through subjects they can relate to, like science and geography.

How might you teach this content?

This booklet aims to support teachers in engaging in talk around the impact of Artificial Intelligence (AI) through structured and progressive lessons across three key stages. Students will develop the vocabulary and critical thinking skills to understand how AI infrastructure affects the natural world. Some of the activities link to the United Nations' Sustainable Development Goals (SDGs).

The activities in this pack are designed for a range of teaching moments. The sessions work well as standalone activities, but also integrate well as part of the wider digital curriculum. Your role is to find the moments where this content, and the deeper philosophical questions it poses, are relevant to the age and stage. The inclusion of different key stages within the booklet is intentional, as it maps out how the ideas progress. You may choose to teach your students sessions from a different key stage, if that matches their current knowledge better. We would advise you to work through booklet 1, 'What is Real?', and booklet 2, 'Can we Trust AI?' before approaching this content.

Learning objectives

- **To know that components of some AI devices come from the Earth**
- **To understand the impact of AI and data centres on the environment**
- **To explain positive and negative viewpoints of the impact of AI and data centres**

What is the impact of AI on the planet?

Children need to understand that AI, like other technologies, exacts a cost on the environment. This cost has real impacts on water supply, land and the local environments where either minerals are extracted to make the products that power it, or data centres draw energy from local towns. The best way to frame these impacts is through the four domains of land, water, energy and electricity.

Here is a useful guide for age and stage



Early Years:

Focus on the idea that the Earth gives us things such as water, soil, air, and that animals and plants also need and use these resources. AI can damage these things and cause harm to the planet.



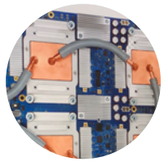
Year 1 and 2:

Introduce the idea that computers need physical things to work; materials, energy and water. Students can talk about what computers give us and what they take from the planet, using simple sentences.



Year 3 and 4:

Introduce the concept of data centres and begin to explore the chain of resources from mining to electricity. Students can discuss fairness and how they feel about this.



Year 5 and 6:

Explore the concept of the digital footprint and personal consumption. Students explore how minerals are mined, how data centres consume water, and how every AI prompt has an energy cost.



Year 7 to 9:

Students learn to talk about how the rapid growth of AI relies on vast amounts of minerals, energy, labour, and manufacturing capacity, often sourced from lower-income countries, meaning many communities in the Global South bear the environmental, economic, and social costs of AI production while receiving few of its benefits.

Pexels-baro-405354470-14942582 – Image of a river (also used on p.9); Pexels-shvets-production-7191984 – Image of a person using a tablet (also used on p.8 and p.15); Pexels-brett-sayles-4508751 – Image of a data centre (also used on p.10, p.18, and p.26); Wikimedia Commons This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license – Image of a Tensor Processing Unit (also used on p.9 and p.17); Pexels-chris-wade-ntezicimpa-564856410-31137175 – Image of a miner (also used on p.9, p.17 and p.24).

Creating a culture of talk

These sessions have been designed to give students plenty of time to explore the themes through talk. This will only be possible after creating a culture where every voice is valued.

Ground rules for talk

Establishing ground rules for talk will help to set high expectations for your students. This can simply be a set of criteria, or Discussion Guidelines, which identify the specific skills needed to engage in purposeful discussions. For example, 'We will take turns to speak' or 'We will be prepared to change our minds.' By explicitly modelling and referring to the oracy skills identified in each session, you will nurture a classroom culture where every student feels confident to speak up.

These sessions include a balance of exploratory talk around key ideas and more presentational talk, where students will consider their audience and plan what they want to say. The ground rules will be different depending on the purpose for the talk.

Scaffolds for talk

Talk Tactics are scaffolds designed to give students varied ways of contributing when they engage in exploratory talk for learning. Remember that these scaffolds offer options, but are not the only ways to contribute. Over time, the aim is that students will respond in these ways naturally, and that at some point the scaffolds can be removed.

The Oracy Framework

Oracy is the ability to articulate ideas, develop understanding and engage with others through speaking, listening and communication.

The Oracy Framework, devised by Voice 21 and Oracy Cambridge, provides a framework through which we can understand what constitutes good speaking and listening in different contexts. It breaks down the skills within oracy into four distinct but interlinked strands:

Physical

How you use your voice, body language and facial expressions

Linguistic

The words you choose to use

Cognitive

The thinking behind what you are saying and the reasons you give

Social & Emotional

The way you engage with, and listen to, others

You will find different purposes for talk, scaffolds for talk and specific Oracy Framework skills identified throughout this booklet.

The Oracy Framework

Use the Oracy Framework to understand the physical, linguistic, cognitive, and social and emotional skills that enable successful discussion, inspiring speech and effective communication.

Physical

Voice

- Pace of speech
- Tonal variation
- Clarity of pronunciation
- Voice projection

Body language

- Gesture & posture
- Facial expression & eye contact

Linguistic

Vocabulary

- Appropriate vocabulary choice

Language

- Register
- Grammar

Rhetorical techniques

- Rhetorical techniques such as metaphor, humour, irony & mimicry

Cognitive

Content

- Choice of content to convey meaning & intention
- Building on the views of others

Structure

- Structure & organisation of talk

Clarifying & summarising

- Seeking information & clarification through questioning
- Summarising

Self-regulation

- Maintaining focus on task
- Time management

Reasoning

- Giving reasons to support views
- Critically examining ideas & views expressed

Social & Emotional

Working with others

- Guiding or managing interactions
- Turn-taking

Listening & responding

- Listening actively & responding appropriately

Confidence in speaking

- Self assurance
- Liveliness & flair

Audience awareness

- Taking account of level of understanding of the audience

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Key Stage 1

Young children are surrounded by technology, but rarely connect it to the natural world. These sessions introduce the foundational idea that everything physical, including the computers and devices we use, come from the Earth too. Through talking about land and water, students begin to understand that the things we rely on are not infinite, and that we have a responsibility to use them wisely. These sessions connect naturally to geography, science and PSHE.

1 Where does it come from?

Objective

- **To know that the materials in our devices come from the Earth**

Talk to learn new words

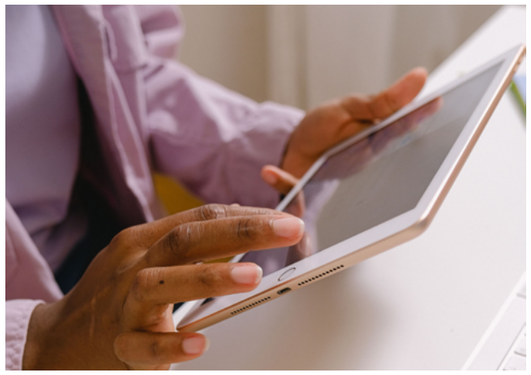
In this first session, students begin to make the connection between the physical world and the technology around them. Young children often think of devices as 'just there', or 'always present' as they have grown up with technology at their fingertips. They do not consider what they are made from or where those materials come from. This session uses simple sorting and talk activities to introduce the idea that computers need the Earth to exist, and that this matters.

Where does this come from?

Hold up a pencil and ask, 'Where did this come from?' After giving students thinking time, guide them towards the idea that the wood came from a tree and the graphite from the ground.

Now hold up a tablet or phone. Ask partners to discuss, 'Where did this come from?' Remind students to take turns and listen to each other's ideas.

We know that phones and tablets, and most other technologies, have components that come from the Earth, but framing it around 'everyday' items is a powerful way to build understanding around what technology is and how it's made.



Show five other everyday classroom objects and ask students to predict and discuss how they are made.

Exercise Book: Paper is made from trees. Water and energy are used to turn wood into paper.

Computer Mouse: Made from plastic, metal and electronic parts. The materials come from oil and minerals found in the Earth.

Interactive Whiteboard: Made from glass, plastic, metals and electronic components. These materials come from sand, oil and minerals.

Chair: Made from wood, metal, plastic or fabric. These materials come from trees, minerals and oil.

Pen: Made from plastic, metal and ink. The materials come from oil, minerals and chemicals.

Share key vocabulary

Natural

Something that comes from the Earth and has not been made by people. Trees, water and stone are natural.

Manmade

Something that has been made or changed by people. Tablets, plastic and cables are manmade.

Natural or manmade?

Show students a series of images one at a time: a river, a tablet, a tree, a phone cable, a stone, a solar panel, a copper wire, a wind turbine. Ask students to discuss in pairs whether each image shows something natural or manmade and then explain why.

The sentence stems below can be used to support the talk.

- I think this is natural because...
- I think this is manmade because...
- It comes from the Earth because...
- I wonder where the … comes from

Oracy reflection questions

Did you use key vocabulary to explain your thinking?

Did you take turns to speak and listen?



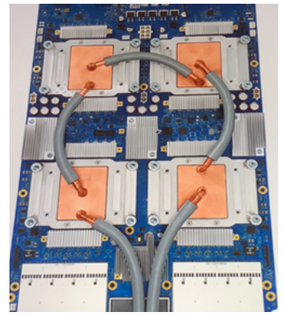






Pexels-baro - Image of a river; Pexels-dumitru-b - Image of a tree; Pexels-matthiaszomer - Image of a cable; Pexels-nguy-n-ph-ng-duy- Image of a wind turbine

The Tiny Chip





Inside every computer and phone, there is a tiny chip. To make it, people have to dig deep into the Earth to find special minerals. It takes a lot of land, a lot of energy and a lot of people to make each chip.

Ask partners to discuss, 'What do you think computer chips do?'

Children will often respond with thoughts around helping the computer work, it being like the computer brain, helping the computer or device think. All of these ideas are worth exploring and support them to understand the purpose of a computer chip.

2 What is a data centre?

Objective

- **To understand that data centres have an impact on the environment**

Talk to understand and reason

In this second session, students encounter one of the most surprising facts about AI: that the data centres storing and running AI systems consume enormous amounts of fresh water. For young children, water is something they drink, wash in and play with. This session connects that familiar understanding to a new idea that computers are also 'thirsty.'

Start by sharing a picture of a data centre so students can visualise what they look like. These examples show a data centre from the outside and inside.

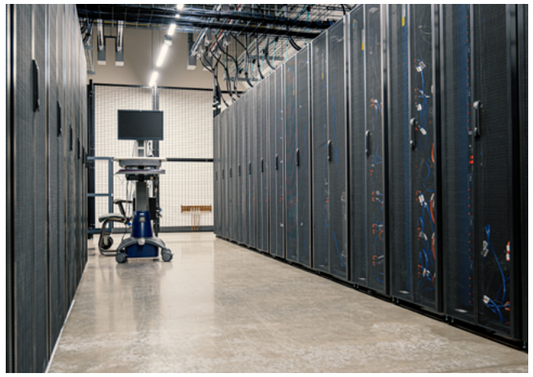
In pairs, students predict what this building might be used for and discuss other buildings that this reminds them of.

Share key vocabulary

Data centre

A very large building full of computers that store and process information for things like AI, the internet and apps.





Pexels-summe- Image of the outside of a data centre
Pexels-brett-sayles - Image of the inside of a data centre

Build

Develop, add to or elaborate on an idea

- "Building on X's idea ____
- "I agree and would like to add ____
- "X's idea made me think ____

Build

Challenge

Disagree or present an alternative argument

- "I disagree because ____
- "To challenge you X, I think ____
- "I understand your point of view, but have you thought about ____?

Challenge

Summarise

Identify and recap the main ideas

- "So far we have talked about ____
- "The main points raised today were ____
- "Our discussion focused on ____

Summarise

What is the impact of data centres?

Ask pairs to discuss their initial thoughts on this question. Next, using a technique called fed-in-facts, read out one statement at a time to provide additional information. (These can be found on the next page). Each statement will give further information about data centres and their impact on the environment. After each fact, ask students to think alone, then discuss again and see if they change their minds.

As you introduce each fact, model how to use these Talk Tactics to say whether you agree or disagree with your partner, giving a reason for your answer.

After all the facts are revealed, ask pairs to summarise what they think the impact of data centres is on the environment.

Oracy reflection questions

Did you give reasons for your answers?

Did you respond to what your partner said?

Data Centre Factsheets

Fact 1

In a data centre, the computers get very, very hot. To cool them down, the building uses lots of fresh water from a nearby lake or river.

Fact 2

A large data centre can use enough water each day to fill several swimming pools.

Fact 3

Farmers need the water from the lake or river to water their crops and look after their animals.

Fact 4

Living things also need the fresh water from the lake or river to survive. These include trees, plants, animals and fish.

3 This is the news

Objective

- **To explain some positive and negative impacts of AI and data centres**

Talk to explain

In this final session, students move from exploring ideas to presenting them. Having spent time understanding how AI systems learn, how data centres consume water and energy, and how the land and ecosystems around them are affected, students are now ready to bring that learning together into a coherent, structured argument. This is a significant step as it challenges students to progress from discussing ideas in pairs or small groups to presenting them to an audience. By the end of this session, students will be able to explain at least two ways AI affects the environment, use key vocabulary from across the booklet accurately and in context, and deliver a short, structured presentation that shows they can weigh up different perspectives rather than simply list facts.

Display the three key words from the previous sessions (natural, manmade, data centre). Ask students to take turns sharing one thing they remember about each word with a partner.

News reporters



Split students up into teams of three and set them the challenge of creating a short news report about how computers and AI are connected to the Earth's resources.



Pexels-cottonbro - Image of a news reporter (also used on p.22 and p.29)

Ask each team to include key facts or messages in their report. Every student has a speaking role and contributes to the final broadcast. This gives everyone the opportunity to practise speaking like a specialist.

News anchor

Open and close the news report, introducing the story and explaining why it is important.

— What is the main headline?

— How will you introduce the story?

Scientific expert

Share a key fact or example about how computers and AI use resources such as water, energy, or materials.

— What key details will you include?

— Will you need to explain the vocabulary you have used?

Field reporter

Explain one way AI and technology impact the environment.

— What facts will you include?

— Will you give a personal response?

Each team will need time to prepare and rehearse what they want to say before presenting. They may choose to speak one after the other, with the news anchor introducing themselves and the other speakers, or they may choose to use questions to introduce and engage the other speakers.

Once each team has prepared what they want to say, introduce these oracy reflection questions so they can hone and improve their performance giving peer feedback.

Oracy reflection questions



Did you use body language to get your point across?



Did you use key vocabulary?



Did you give clear reasons to explain your viewpoint?



Now it is time to tune into the news reports! Choose whether each trio joins another to present to each other, or whether a whole-class audience is more appropriate for your students. You may also choose to record the news reports to share with families afterwards.

After each news report, ask students to give feedback using these sentence stems to help.

Feedback sentence stems

I liked it when you said...

When you said…it made me think/wonder…

To make it even clearer, you could…

I have a question about...

Key Stage 2

At Key Stage 2, students are ready to follow the chain of resources that connects the things they use online to the physical world. These sessions explore how minerals are mined, how data centres consume water, and how every AI prompt has an energy cost. Students will develop the vocabulary and reasoning skills to evaluate these costs and form structured arguments about sustainability and fairness. The content connects to science (materials, energy), geography (global resource distribution), and computing.

Depending on the prior knowledge of your students, you may want to use some of the Key Stage 1 content to introduce these sessions.

1 Mining and materials

Objective

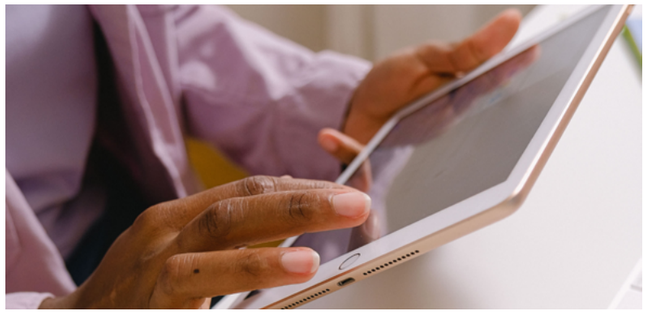
- To know that components of devices come from the Earth

Talk to use new language

In this first session, students explore where the materials inside everyday devices come from and challenge some common misconceptions they may have. Many children think phones, tablets and computers are simply made in factories, without considering where the materials inside them originate. Others may assume that minerals and metals are easy to find or that technology has little connection to people and places around the world. Students will investigate what mining is, where the materials used in devices are found, and how people, communities and environments can be affected by the process. Through discussion, they will begin to understand the hidden journey behind the technology they use every day.

What's inside?

Start by holding up or showing an image of a device (tablet, phone or laptop). Ask students where they think each part came from? Not the factory or shop, but where did the parts inside come from? Ask students to discuss and predict with a partner. Use these sentence stems to support the talk.



I think the… might be made from…

I wonder if this part comes from… because…

I'm not sure, but maybe…

Repeat this with other items such as an iPhone, laptop, XBox games console or VR headset.

Share key vocabulary

Tensor Processing Unit (TPU)

AI needs special chips called Tensor Processing Units (TPU). They are the processing chips that sit within huge racks inside data centres and act like the brain of AI. They are made from materials dug out of the ground.

Mineral extraction

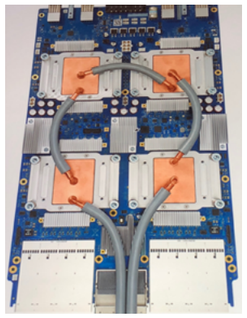
The process of digging into the Earth to remove natural resources like lithium, cobalt, copper and rare earth elements used in things such as electronic devices.

The Journey of a Chip

Show students an image of a TPU (Chip).
Ask the questions:

- Does it look like you expected?
- What metals might be inside?
- Where do those metals come from?

Present students with a simplified version of the supply chain for a smartphone or AI chip.





1. Mining	2. Processing	4. Shipping	3. Manufacturing	5. Use & Disposal
Minerals dug from the ground, often in the Global South	Raw materials refined and processed using energy and water	Chips and components assembled in factories, often in Asia	Products transported globally by sea, road and air	Devices used, discarded as e-waste – often returned to the Global South

Explain that many of the minerals used in AI hardware, such as cobalt, lithium, and coltan, are found in countries in the Global South, including the Democratic Republic of Congo, Bolivia and Indonesia. The people who mine these minerals are often paid very little, work in dangerous conditions, and live in communities that see little economic benefit from the technology their land makes possible.

In pairs, assign one student 'Partner A' and ask them to retell the first part of the journey of an AI chip using the key vocabulary where possible. Pass over to 'Partner B' to retell the next step of the journey. Continue taking turns until the journey is complete.

Oracy reflection questions

Did you use key vocabulary to explain your thinking?

Did you take turns to speak and listen?

2 The impact of data centres

Objective

- **To understand the impact of data centres on the environment**

Talk to understand and reason

In this second session, students explore one of the most surprising environmental costs of AI: its water footprint. Data centres are buildings full of computers that power AI. These buildings rely on vast amounts of fresh water to keep their servers cool. As the demand for AI use grows, so does demand on local water supplies, often in regions already experiencing water stress. This is an interesting dynamic as the fresh water cools the 'chips' (TPUs) that students learned about in session 1. Using water to cool data centres has a knock-on effect on the local ecosystem, particularly wildlife on land and wildlife within local water-based ecosystems. This session supports students to explore how AI uses water and the impact of this on the environment.

Understanding Data Centres

Show students an image of a data centre. This is an example of a data centre from inside and outside, like the ones located near Dublin. There are between 80-90 operational AI data centres within the area.





In pairs, students predict what this building might be used for and discuss other buildings that this reminds them of. Guide them to use some of the key vocabulary used in the previous sessions in their predictions.

Share Key Vocabulary

Data centre

A large building full of servers (powerful computers) that store and process information for AI systems, apps and websites.

Evaporative cooling

The method most data centres use to cool their servers. Water is circulated and evaporated to absorb heat, similar to how sweating cools the human body.

Harkness-style discussion

Ask partners to join another pair to make a group of four. Explain that they are going to find out more about this data centre together. For this style of discussion, students have information to pre-read before working collaboratively to answer a question. In this variation, each member of the group will get a different information sheet, so it will be important to hear about what each other has read, before discussing their thoughts. The fact sheet can be found on the next page and will need copying and cutting into four sections.

After giving time for each of the group to read their fact sheet, ask them to discuss,

Is the impact of data centres worth it?

Support students by modelling how to use the Talk Tactics to summarise their fact sheet, and then build on or challenge the views of the group.

During the discussion, you may want to steer students towards specific aspects to discuss like:

- Do data centres bring enough jobs to local communities to make them worthwhile?
- Does Ireland's rainy climate mean water use by data centres is not a concern?
- Could solar panels make any difference to data centre energy use in Ireland?
- How could communities balance the energy needs of data centres and local people?

Summarise

Identify and recap the main ideas

- "So far we have talked about ____
- "The main points raised today were ____
- "Our discussion focused on ____

Summarise

Build

Develop, add to or elaborate on an idea

- "Building on X's idea ____
- "I agree and would like to add ____
- "X's idea made me think ____

Build

Challenge

Disagree or present an alternative argument

- "I disagree because ____
- "To challenge you X, I think ____
- "I understand your point of view, but have you thought about ____?

Challenge

Oracy reflection questions

Did you give reasons for your opinions?

Did you respond directly to what your partner said?

Data Centre Factsheets

Facts 1

What is a data centre?

A data centre is a large building full of powerful computers called servers. These computers help run the internet, apps, videos, games, cloud storage and AI tools.

How many data centres are there in Ireland?

- Ireland has about 110 data centres. This number changes regularly.
- Around 80-90 of them are near Dublin.
- Dublin is one of Europe's biggest data centre hubs.

Facts 2

How big are they?

Data centres can be enormous. Some are as large as 10 football pitches. The biggest can cover more than 100,000 square metres. Many contain thousands of servers working day and night.

How many people work there?

Data centres employ people such as engineers, electricians, technicians and security staff. A large data centre may employ 50 people when it is operating. During construction, hundreds of workers may help build it.

How much land do they use?

Data centres need space for buildings, roads, cables and cooling equipment. One large data centre can cover the same area as several football pitches. Building data centres can change how land is used in a local area.

Facts 3

How do they use water?

Computers get very hot when they work.

- Water is often used to help cool the servers.
- Some data centres use millions of litres of water each year.
- The water may come from local supplies, rivers or reservoirs.

How do they use electricity?

Data centres need electricity 24 hours a day.

- They use electricity to run computers, lighting and cooling systems.
- Data centres now use about one-fifth (20%) of Ireland's electricity.
- Some companies use renewable energy such as wind and solar power to reduce their impact.

Facts 4

What are the benefits?

- Create jobs for local people
- Support the internet, apps and AI
- Bring investment into local communities
- Help businesses and schools use digital technology

What are the challenges?

- Use large amounts of electricity
- Can use significant amounts of freshwater
- Take up land that could be used for other purposes
- May affect local wildlife if not managed carefully
- Increase pressure on local infrastructure

Key Stage 2

3 Newsroom Challenge

Objective • **To explain the positive and negative impacts of data centres**

Talk to explain

In this final session, students bring together their learning about land, water, energy and electricity to engage with a fundamental policy question: are the benefits of AI worth the environmental cost? They will consider different perspectives before presenting these in a news report. Just as data centres draw on fresh water supplies and place pressure on local ecosystems, they also consume significant amounts of energy, much of it still generated from fossil fuels. This connects back to the chips and servers students explored in earlier activities, helping them see AI not as an invisible tool but as a physical technology with real consequences for the planet. Students will represent a range of voices and weigh up competing needs and priorities.

Display the four key words from the previous sessions (Tensor Processing Unit (TPU), mineral extraction, data centre, evaporative cooling). Ask students to take turns sharing one thing they remember about each word with a partner.

Newsroom challenge



In this activity, students work in teams of 3 to become news reporters investigating the positive and negative impact of data centres. They relate this to specific United Nations Sustainable Development Goals (SDGs) and whether new AI data centres help or hinder progress towards them.

Students are asked to respond to the incoming story that the UK government wants to partner with AI companies such as OpenAI (the builders of ChatGPT) to create new jobs in the technology sector. As part of this plan, they hope to build new data centres.

Ask each team to assign newsroom roles, giving every student a chance to speak and contribute to the final broadcast. This gives everyone the opportunity to practise speaking like a specialist.

News anchor

Open and close the news report, introducing the story and explaining why it is important.

- What is the main headline?
- How will you introduce the story?
- How will you bring the report to a close?

Scientific expert

Share key facts about data centres and examples about how computers and AI positively and negatively impact lives.

- How will you summarise the key benefits?
- What key details will you include?
- Will you need to explain the vocabulary you have used?

Field reporter

Explain how this relates to one of the Sustainable Development Goals and the impact data centres have on the environment.

- What facts will you include?
- Will you give a personal response?
- What is your recommendation for the future?



The first stage of preparing the news report is the research phase. Ask each group to choose one of the sustainability goals below to research and link to the information they already have about mineral extraction and data centres. You can find information on the United Nations' Sustainable Development Goals (SDGs) here.

Ask them to consider:

- How could AI and data centres help achieve this goal?
- How could AI and data centres make this goal harder to achieve?
- What solutions could reduce the negative impacts?

SDG 8: Decent Work and Economic Growth
SDG 14: Life on Water
SDG 15: Life on Land

Each team will then need time to rehearse what they want to say. They may choose to speak one after the other, with the news anchor introducing themselves and the other speakers, or they may choose to use questions to invite the other speakers to share.

Once each team has prepared what they want to say, introduce these oracy reflection questions so they can hone and improve their performance through peer feedback.

Oracy reflection questions

- Did you use facial expressions and body language to get your point across?
- Did you use and explain key vocabulary?
- Did you give clear reasons to explain different viewpoints?

Now it is time to go live to the newsroom! Choose whether each trio joins another to present to each other, or whether a whole-class audience is more appropriate for your students. You may also choose to record the news reports to share with families afterwards.

After each news report, ask students to give feedback, using these sentence stems to help.

Feedback sentence stems

- One fact I learned was...
- I agreed/ disagreed with what you said about ... because ...
- I was surprised by...
- I would like to know more about...
- The strongest evidence was...

Key Stage 3

By Key Stage 3, students are ready to engage with the full complexity of AI's environmental impact. These sessions move beyond individual behaviour to systemic and global questions: who bears the environmental burden of AI, and who benefits? Behind every AI tool lies a supply chain that begins in the ground - in the mines of the Democratic Republic of Congo, the lithium flats of Bolivia, or the rare earth deposits of Indonesia. This is where local communities, often with little political power and few legal protections, live with the land, water and health costs of extracting the materials that make AI hardware possible. Students will explore what it means when the devices and data centres that power AI for wealthy nations leave lasting damage in the places and communities least responsible for the demand. They will also draw on scientific concepts such as energy transfer, resource depletion and carbon cycles while examining power, ethics and democratic accountability. The content connects naturally to computing, geography, science, PSHE and citizenship.

Depending on the prior knowledge of your students, you may want to to use some of the Key Stage 2 content to introduce these sessions.

1 From the Earth to the screen

Objective • To know that materials inside AI devices come from the Earth

Talk to acquire and use new language

In this first session, students examine the land dimension of AI's environmental impact. They will explore the concept of 'slow violence', the idea that some environmental harms are not dramatic events but gradual, cumulative processes that affect communities over decades. Students will examine how the minerals powering AI are extracted from the Global South and consider what, if anything, can be done about this. This part of the booklet has strong links to science and geography, as the activities challenge students to think about the cause and effect of AI on the environment. Students will learn new terminology to help them navigate the language that surrounds AI as an emerging technology.

Case Study

Cobalt in the Democratic Republic of Congo

The Democratic Republic of Congo (DRC) holds approximately 70% of the world's known cobalt reserves. Cobalt (Co) is essential for the lithium-ion batteries that power AI devices, phones, laptops, data centre backup systems as well as electric vehicles.

Miners, including children, dig cobalt by hand in dangerous conditions, with little protective equipment, for wages that rarely exceed a few dollars a day. The communities near mines often suffer from toxic contamination of soil and water, respiratory illness, and displacement from their land.

The profits from this cobalt flow primarily to technology companies headquartered in the USA, Europe and China. The DRC remains one of the world's poorest countries despite sitting on one of its most valuable resources.



Share key vocabulary

Rare earth elements

A group of 17 metallic elements found in the Earth's crust in low concentrations. They are essential for the magnets, batteries and screens in AI hardware but are expensive and damaging to extract.

Extraction

The process of taking natural resources, such as minerals, oil or gas, out of the Earth so they can be used by people.

Slow violence

Harm that happens slowly over a long time, so people may not notice it straight away. For example, mining can gradually damage land, water and wildlife over many years.

Always, sometimes, never

Ask partners to consider each of the statements below, one at a time, discussing and deciding if they are always, sometimes or never true.

- AI companies should know where their cobalt comes from.
- Environmental harm that happens slowly is less serious than environmental harm that happens quickly.
- The countries that benefit most from AI should pay the most to clean up its environmental damage.
- It is possible to use AI ethically without fully understanding where the hardware comes from.

Use these sentence stems to support the discussion.

I think rare earth elements must be...

I wonder whether the extraction of [mineral] is contested because...

This is an example of slow violence because the extraction of [mineral] has gradually...

From the perspective of environmental justice, the communities near these extraction sites...

Wrap up the session by asking partners or the whole-class to discuss:

What is your responsibility in knowing the costs of AI and who pays?

Oracy reflection questions

Did you use new vocabulary correctly to support your ideas?

Did you ensure both partners got equal time to speak?

2 The invisible costs

Objective • To understand the impact of AI usage on the environment

Talk to understand and reason

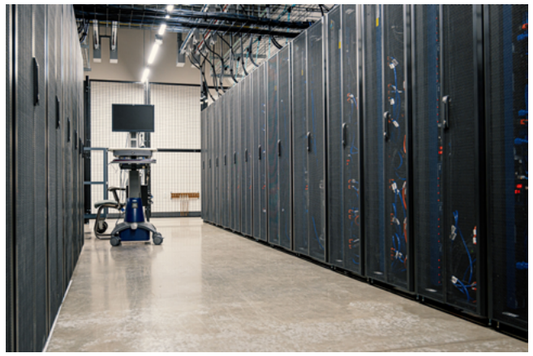
In this second session, students move into the science of AI's resource consumption. The concepts of direct and indirect water use, energy transfer, evaporative cooling and carbon emissions all have real-world grounding in the physics and chemistry curriculum, connecting what students already know about states of matter, heat transfer and the carbon cycle to the infrastructure that powers the AI tools many of them use daily. This session builds both scientific literacy and critical thinking, asking students not only to understand the environmental cost of AI but to interrogate how, and whether AI companies communicate that cost honestly to the public.

Students will develop a more accurate and evidence-informed picture of what AI actually demands from the planet. By the end of the session, students should be able to explain AI's resource use in scientific terms, assess the scale of that use, and begin to question the narratives that surround it.

Energy Transfer in Data Centres

Start by showing students an image of a data centre. Ask them to tell their partner what they know about these centres already. A data centre is a large building full of servers (powerful computers) that store and process information for AI systems, apps and websites.





In science, we talk about energy transfer. When a server processes an AI query, electrical energy is converted to heat energy. This heat must be removed, normally by evaporating water. The water vapour carries the heat energy away from the building. In regions where water is scarce, this process competes directly with human and ecological needs

Share Key Vocabulary

Evaporative cooling

A process in which water is circulated through a cooling system and then evaporated, absorbing heat energy as it does so. Data centres rely on this to prevent servers overheating.

Direct water use

Water used directly inside a data centre for cooling the servers. This water is largely consumptive, once evaporated, it does not return to the local water source.

Indirect water use

Water used by the power stations that generate the electricity to run data centres. Thermal power stations use water to generate steam and to cool condensers. Water use happens outside of the data centre and is returned to the water source afterwards.

Carbon intensity

The amount of carbon dioxide emitted per unit of electricity generated. Electricity generated from coal has high carbon intensity; solar and wind have near-zero carbon intensity.

Concept Cartoon

After sharing the key vocabulary, ask the key question 'Is it possible to know the full environmental impact of AI?'

Introduce the Concept Cartoon on the next page. It describes four different opinions on the question. Ask students to discuss who they agree with most and why. Ask each pair to nominate one student to summarise their opinion at the end of the discussion.

Scaffolds for talk

Build

Develop, add to or elaborate on an idea

- "Building on X's idea ____
- "I agree and would like to add ____
- "X's idea made me think ____

Build

Challenge

Disagree or present an alternative argument

- "I disagree because ____
- "To challenge you X, I think ____
- "I understand your point of view, but have you thought about ____?

Challenge

Summarise

Identify and recap the main ideas

- "So far we have talked about ____
- "The main points raised today were ____
- "Our discussion focused on ____

Summarise

Oracy reflection questions

Did you give reasons for your opinions?

Did you respond directly to what your partner said?

Key Stage 3

3 Breaking news

Objective • To explain the positive and negative impacts of AI and data centres

Talk to explain

In this final session, students move from analysis to advocacy. Having examined what AI costs the planet across four interconnected themes, they are now asked to consider who is responsible for these costs and what, if anything, should be done. This is an inherently political question. Critical AI literacy requires students to understand that technology is not neutral, that its costs and benefits are distributed by human decisions, and that democratic participation matters. This task culminates in a group presentation where students select one of the United Nations Sustainable Development Goals (SDGs) and create a news-style presentation to perform to the class.

Display the seven key words from the previous sessions (rare earth elements, slow violence, extraction, evaporative cooling, direct water use, indirect water use and carbon intensity). Ask students to take turns sharing one thing they remember about each word with a partner.

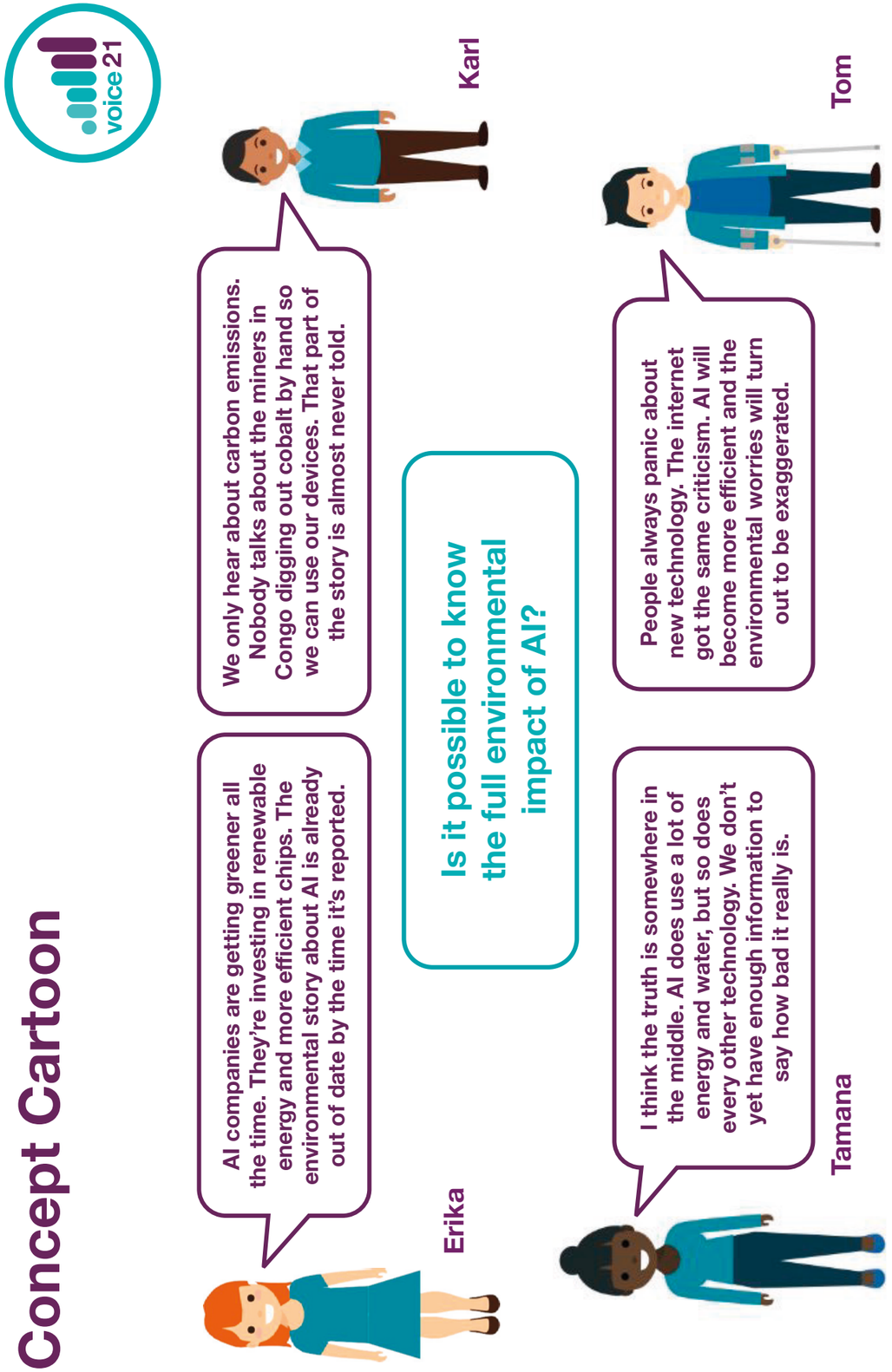


Sustainable Development Goals

In this activity, students work in teams of four to become a news team. Their job is to investigate how AI is affecting one of the UN Sustainable Development Goals (SDGs) then present their story live, like a real news broadcast.

Ask each team to assign roles, giving every student a chance to speak and contribute to the final broadcast. This gives everyone the opportunity to practise speaking like a specialist.

Concept Cartoon



News anchor

Open the broadcast, introduce the story, the SDG and why it matters. Delivers the closing call to action.

- What is the main headline?
- How will you introduce the story?
- How will you bring the report to a close?

Scientific expert

Share key facts and data points, give examples of how computers and AI positively and negatively impact lives and how they connect to the SDG.

- How will you summarise the key benefits?
- What key facts will you include?
- Will you need to explain the vocabulary you have used?

Field reporter

Present the evidence from a specific location, sharing key facts, statistics or real examples about who is affected and how.

- What facts will you include?
- Will you give a personal response?
- What is your recommendation for the future?

Community member

Speak from a personal point of view of how and when they use AI and their understanding of the environmental impact.

- What is your opinion on the SDG?
- What does this look like on a day-to-day basis?
- What would you like to happen next?

The first stage of preparing the news report is a research phase. Ask each group to choose one of the sustainability goals below to research and link to the information they already have about mineral extraction and data centres. You can find information on the United Nations' Sustainable Development Goals (SDGs) here.

Ask students to consider:

- Which goal connects most to what you've discovered about AI, land, water, and energy?
- What is the story you most want to tell?

SDG 7: Affordable and Clean Energy
SDG 8: Decent Work and Economic Growth
SDG 9: Industry, Innovation and Infrastructure
SDG 14: Life Below Water
SDG 15: Life on Land

Each team will then need time to rehearse what they want to say. They may choose to speak one after the other, with the news anchor introducing themselves and the other speakers, or they may choose to use questions to introduce the other speakers.

Once each team has prepared what they want to say, introduce these oracy reflection questions so they can hone and improve their performance through peer feedback.

Oracy reflection questions



Did you use facial expressions and body language to get your point across?



Did you give clear reasons to explain different viewpoints?



Did you use and explain key vocabulary?



Now it is time to go live to the newsroom! Choose whether each group joins another to present to each other, or whether a whole-class audience is more appropriate. You may also choose to record the news reports to share with families afterwards.

After each news report, ask students to give feedback, using these sentence stems to help.

Feedback sentence stems

Your story was convincing because you...

I want to find out more about... after hearing you...

The evidence you used made me wonder...

Your call to action inspired me to...

To make your broadcast even stronger, try...

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Useful support and resources

DfE Generative artificial intelligence (AI) in education

Keeping Children Safe in Education

DfE Generative AI: product safety standards

If you are interested in learning more about safe and ethical use of AI in education, STEM Learning has a range of CPD courses.

www.stem.org.uk/artificial-intelligence

If you are interested in exploring other ways in which talk can elevate learning, you can download Voice 21's oracy starter kit here.

membership-hub.voice21.org/oracy-starter-kit

This booklet does not endorse AI tools or platforms but the author acknowledges that some activities require text and image generation. To support teachers, the following Large Language Models (LLMs) could be used. Always consult your school IT Lead when working with LLMs.

Gemini (Google)	Use Google's Imagen image model to generate images
ChatGPT (OpenAI)	Generates text and images in the non-paid versions but limits apply
Claude (Anthropic)	This LLM is very good at text generation for conversational engagement
CoPilot (Microsoft)	This is an AI assistant powered by LLMs and is very good for image creation



STEM LEARNING

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